

Range Extensions for Four Sacoglossan Opisthobranchs from the Coasts of California and the Gulf of California

(Mollusca : Gastropoda)

BY

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(2 Maps)

INTRODUCTION

SIX OPISTHOBRANCH SPECIES of the order Sacoglossa have previously been recorded from coastal California and 9 species from the Gulf of California. The present report establishes the total number of sacoglossans reported from California to be 7 and the total number from the Gulf of California to be 10. The ranges of two other species are extended within their respective provinces. The sacoglossan opisthobranchs from the California and Gulf coast are listed, together with their known geographic ranges, as follows:

Sacoglossans from California

1. *Alderia modesta* (Lovén, 1844)
San Juan Islands, Washington, to Elkhorn Slough, California; Europe
2. *Elysia hedgpethi* Marcus, 1961
= *Elysia bedeckta* MacFarland, 1966
San Juan Islands, Washington, to Bahía de los Angeles and Puertecitos, Baja California to Bahía de San Carlos, Sonora
3. *Hermaea vancouverensis* O'Donoghue, 1924
Vancouver Island, Washington to Bodega Harbor, California
4. *Hermaea oliviae* (MacFarland, 1966)
Duxbury Reef, California to Monterey Bay, California

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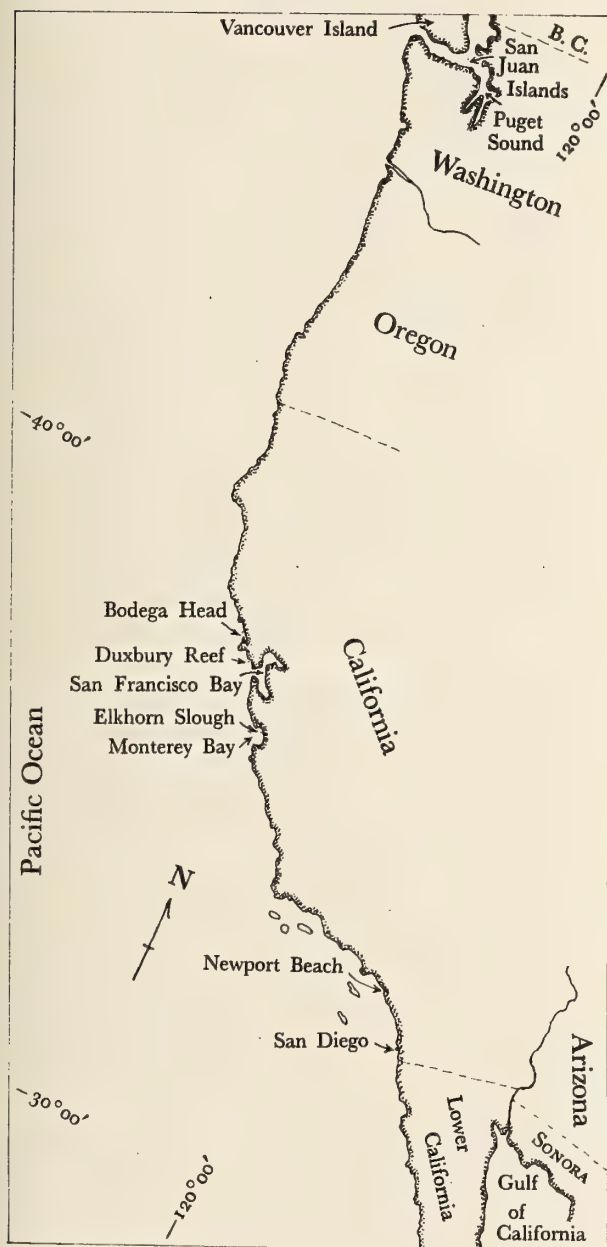
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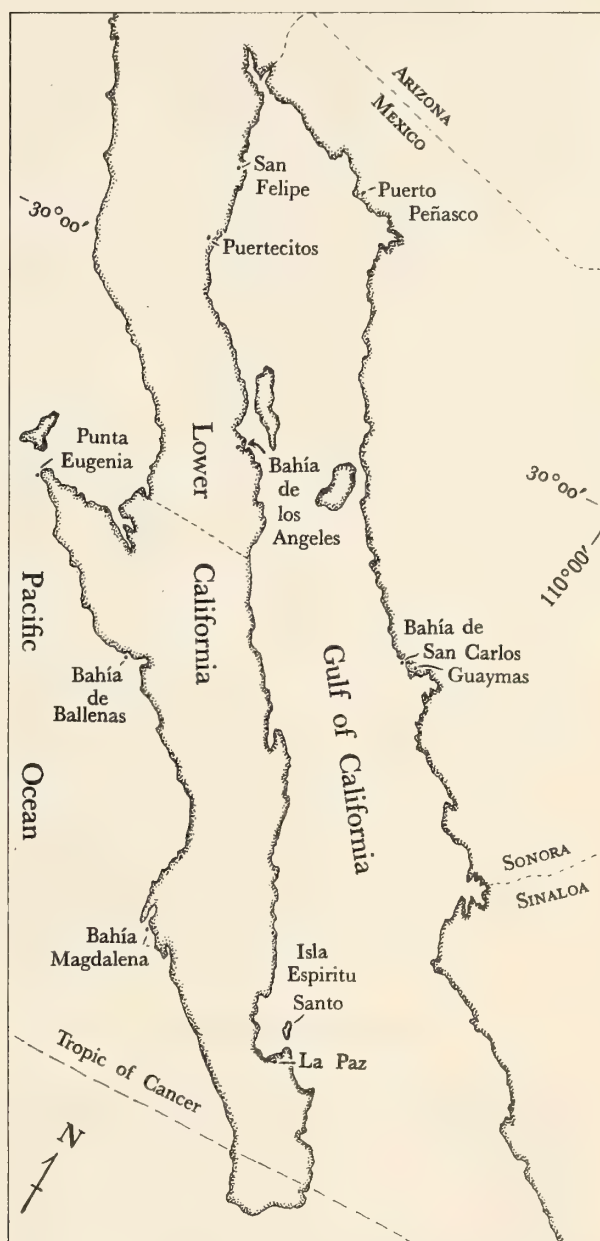
5. *Hermaeina smithi* Marcus, 1961
= *Phyllobranchopsis enteromorpha* Cockerell & Eliot, 1905 in MacFarland, 1966
San Juan Islands, Washington to San Diego, California and Bahía de San Carlos, Sonora
6. *Placida dendritica* (Alder & Hancock, 1843)
= *Hermaea ornata* MacFarland, 1966
Bodega Head, California to Newport Bay, California
7. *Stiliger fuscovittatus* Lance, 1962
San Juan Islands, Washington to San Diego, California and Bahía de los Angeles, Baja California

Sacoglossans from the Gulf of California

1. *Berthelinia chloris* (Dall, 1918)
= *Berthelinia belvederica* Keen & Smith, 1961
Bahía Ballenas, Punta Abreojos to La Paz, Baja California
2. *Cylindrobulla californica* Hamatani, 1971
Isla Espiritu Santo, Bahía San Gabriel, Baja California
3. *Elysia hedgpethi* Marcus, 1961
San Juan Islands, Washington to Bahía de los Angeles and Puertecitos, Baja California, and to Bahía de San Carlos, Sonora
4. *Elysia vreelandae* Marcus & Marcus, 1970
San Agustin, Sonora, Mexico
5. *Hermaea hillae* Marcus & Marcus, 1967
Puerto Peñasco, Sonora, Mexico
6. *Hermaeina smithi* Marcus, 1961
San Juan Islands, Washington to San Diego, California and Bahía de San Carlos, Sonora



Map of California



Map of Lower California

7. *Julia thecaphora* (Carpenter, 1857)
 = *Julia equatorialis* Pilsbry & Olsson, 1944
 La Paz, Baja California to Peru

8. *Oxynoe panamensis* Pilsbry & Olsson, 1943
 Southern end of the Gulf of California to Panama Bay

9. *Stiliger fuscovittatus* Lance, 1962
 San Juan Islands, Washington to San Diego, California and Bahía de los Angeles, Baja California

10. *Tridachiella diomedea* (Bergh, 1894)
 Throughout the Gulf of California to Panama

Elysia hedgpethi Marcus, 1961

The elysiacean sacoglossan *Elysia hedgpethi* has been recorded by MARCUS (1961) at the type locality in Tomales Bay and MACFARLAND (1966) from Monterey Bay (as *E. bedeckta*). KEEN (1971: 817) records the range of the species as from Puget Sound, Washington to Bahía de los Angeles, Baja California.

In December of 1970, we observed 3 individuals of this species in the exposed intertidal lava pools near the mouth of Bahía de San Carlos, Sonora, Mexico. On March 28, 1972, 12 individuals were observed in the intertidal rocky region just north of Puertecitos, Baja California. On both occasions the animals were observed on the chlorophyte alga *Codium* sp. The citing at Puertecitos represents a northern range extension inside the Gulf of California of approximately 150 miles (240 km). The citing at Bahía de San Carlos establishes the species on the eastern shores of the Gulf of California. The newly established range of *Elysia hedgpethi*, thus, is from Puget Sound (San Juan Islands), Washington to Bahía de los Angeles and Puertecitos, Baja California, and to Bahía de San Carlos, Sonora.

The animals collected from the Sea of Cortez were quite small (under 6 mm in length). The species is distinguished by its large, thin, undulating parapodia, greenish coloration, auriculate rhinophores, and severely flattened body when the parapodia are extended downward.

One other species of *Elysia* Risso, 1818 is known from the Gulf of California: *E. vreelandae* Marcus & Marcus, 1970, known only from the type locality, San Agustín, Sonora, Mexico. It is described (MARCUS & MARCUS, 1970: 194) as being "a small, dark olive-green species with lighter borders of the parapodia and blue dots."

Hermaea vancouverensis O'Donoghue, 1924

The small sacoglossan *Hermaea vancouverensis* has been recorded previously only in the original description from the type locality, the Vancouver Island region, British Columbia, Canada.

On July 7, 1971, while we were observing the fauna of the *Zostera marina* (Linnaeus, 1756) environment in Bodega Harbor, Sonoma County, California, egg masses which appeared to be those of an opisthobranch were seen on the blades of *Zostera*. Closer examination yielded many specimens of a small, dark green sacoglossan which proved to be *Hermaea vancouverensis*.

It was later discovered that *Hermaea vancouverensis* had been feeding on the epiphytic diatom *Isthmia nervosa* which abounds on the *Zostera* leaves. O'DONOGHUE (1924) notes that *H. vancouverensis* is found on *Zostera* and presumably feeds on epiphytic diatoms.

On July 20, 1971 additional field observations were made at the same locality. In a square meter sample over 75 individuals of *Hermaea vancouverensis* were counted. While this estimate does not pretend to be random or statistically valid, it does give some idea as to the relative abundance of this sacoglossan at that particular time. Additional observations made in January of 1972 yielded no individuals although *Isthmia* was seemingly more abundant. No factor accountable for the complete absence of the population could be discerned.

On March 5, 1972, 2 individuals of *Hermaea vancouverensis* were found on *Isthmia nervosa* in the open coastal environment of Coleman State Beach, Sonoma County, California, just a few kilometers north of Bodega Harbor. On May 16, 1972, a single animal was found in the same locality. These findings are significant since *H. vancouverensis* has not previously been recorded from the rocky intertidal environment.

The occurrence of *Hermaea vancouverensis* in the Bodega Bay region is of particular zoogeographical significance, as its presence in Bodega Harbor and at Coleman Beach represents a southern range extension of well over 900 miles (1440 km).

In external appearance *Hermaea vancouverensis* is quite similar to *H. oliviae* (MacFarland, 1966). MARCUS & MARCUS (1967: 154) reassigned *H. oliviae* from *Hermaeina* to *Hermaea* based on radular tooth shape. Both species have a light yellowish-white ground color with dark green stippling around the dorsal surface. The main external differences between the two species are the yellow-tipped cerata in *H. oliviae* as contrasted with the lack of a differentially colored ceratal apex in *H. vancouverensis*. The cerata in *H. oliviae* are very regular in shape as contrasted to the quite irregularly shaped cerata of *H. vancouverensis*. Internally the differences between the two species are quite marked. The radular teeth of *H. oliviae* have many denticles while those of *H. vancouverensis* are smooth and lack any denticulation.

On the basis of spindle-shaped rhinophores in *Hermaea vancouverensis*, MARCUS & MARCUS (1967: 153) have transferred the species to the genus *Stiliger*. However, the rhinophores are auriculate as in more typical members of the Sacoglossa and therefore the question of generic assignment should be investigated further.

Hermaeina smithi Marcus, 1961

The sacoglossan opisthobranch *Hermaeina smithi* has previously been known from the San Juan Islands, Washington to San Diego, California. ROLLER & LONG (1969) report the species as being frequent at Cayucos, Hazard Canyon, and Shell Beach in San Luis Obispo County,

California, GOSLINER & WILLIAMS (1970) report it as being a frequent animal in the intertidal pools of Duxbury Reef in Marin County, California. GONOR (1962: 86) records the species from several localities in the Puget Sound area of Washington, along with the following California stations: La Jolla, Newport Bay, Bolinas, Tomales Bay, and Bodega Bay.

On December 24, 1970, two individuals of *Hermaeina smithi* were observed at Bahía de San Carlos, Sonora, Mexico on the eastern side of the Gulf of California (Lat. 27°55'N; Long. 111°05'W). The animals were crawling on the chlorophyte alga *Enteromorpha* sp., in the shallow pools of the intertidal mudflats at low tide.

This citing represents the first known record of *Hermaeina smithi* south of San Diego and the first record of the genus and species in the Gulf of California and well into the Panamic province. It represents a southward range extension of approximately 5 degrees of latitude. The newly established range of the species, thus, is from San Juan Island, Washington to San Diego, California and to Bahía de San Carlos, Sonora. No intermediate stations between San Diego and Bahía de San Carlos have been reported as yet.

The animals from Sonora are externally very similar to Pacific coast specimens collected in recent years. The 2 individuals observed measured 9 mm and 12 mm in length, respectively. They can be characterized by their very dark to almost black body coloration interrupted with patches of cream-white at the bases of the cerata, tips of the rhinophores, and eye regions of the head. The rhinophores are elongate auriculate, characteristic of the sacoglossans and distinguishing this species from the eolid nudibranchs. Otherwise, the cerata and general body shape closely resemble that of some eolids and the species may be mistaken for an eolid on superficial observation.

Two other species of the family Hermaeidae have been recorded from the Gulf of California: *Hermaea hillae* Marcus & Marcus, 1967, from the type locality, Puerto Peñasco, Sonora, Mexico, and *Stiliger fuscovittatus* Lance, 1962, from Bahía de los Angeles on the western side of the Gulf.

Placida dendritica (Alder & Hancock, 1843)

This small green sacoglossan has been reported from Monterey Bay, California by MACFARLAND, 1966. LONG (1969) synonymized *Hermaea ornata* MacFarland, 1966 with *Placida dendritica* Alder & Hancock, 1843. In the same paper LONG established the geographical range of the species as from Pismo Beach in San Luis Obispo County, California to San Francisco Bay. GOSLINER & WILLIAMS

(1970) extended the range further southward, recording the species from San Francisco Bay to Newport Beach, Orange County.

During June and July, 1971, the authors collected numerous individuals of *Placida dendritica* from the outer coast of Bodega Head in Sonoma County, California (Lat. 38°18'N; Long. 123°04'W). The animals were found in the rocky intertidal zone of this region crawling on the siphonatean chlorophyte alga *Codium fragile* (Suringar) Hariot. LONG (1969: 10) and MACFARLAND (1966: 400) report the animal on *Bryopsis*, also a siphonatean chlorophyte, which is a frequently encountered alga in the bay boat landings and shores of California. The newly established range of *Placida dendritica* is Bodega Head, Sonoma County to Newport Beach, Orange County, California. The occurrence of this species in the Bodega Bay region constitutes a northward range extension of approximately 60 miles (ca. 100 km).

The individuals of *Placida dendritica* collected from the Bodega Bay region did not exceed 7 mm in length. The species can be distinguished by the elongate, auriculate rhinophores and yellowish to whitish body color with green cerata and green mottling around the sides and top of the head, rhinophores, and caudal region. Because of its overall green coloration, the animal is usually difficult to distinguish from the similarly colored *Bryopsis* and *Codium*, the two algal substrata upon which *Placida* is usually found.

On May 14, 1972 we observed 12 individuals of *Placida dendritica* on *Codium fragile* in the lower zone exposed tide pools of Duxbury Reef, Marin County, California. This represents another collecting station within the newly established range of the animal.

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